

Stephen Kerby – HEP seminar 10/2/2023
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Title: Pulsars, Blazars, and More with *Fermi* and *Swift*

Abstract: In the past fifteen years, the *Fermi* Gamma-ray Space Telescope has identified over 6,000 MeV/GeV gamma-ray sources across the sky, but 2,000 of these sources are still "unassociated", lacking confident classification or identification with astronomical objects. These unassociated sources are a systematic gap in our understanding of the high-energy universe. Over the past five years, I've used observations with the Neil Gehrels *Swift* Observatory to pinpoint low-energy counterparts to hundreds of unassociated targets. Using machine learning classification and regression, I've shown that many of the unassociated sources are blazars and pulsars, while finding dozens of unusual or unexpected sources that might be rare or new classes of gamma-ray objects. Notably, the dim blazars of the unassociated sources have particularly extreme spectra, suggesting that they might be a significant contributor to GeV, TeV, and astroparticle backgrounds. I have also connected several unassociated sources to newly discovered TeV emission regions, suggesting that the dimmest and most enigmatic *Fermi* sources can also add lower-energy context to TeV and particle observatories.